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A REPORT OF 113 EARLY OR PREMATURE EXTRACTIONS OF PRIMARY MOLARS AND THE INCIDENCE OF CLOSURE OF SPACE

By John C. Brauer, D.D.S., M.Sc.*

The early or premature extraction of primary molars has caused much concern within the past few years, and there are those in the profession who do not make a serious attempt to evaluate such extraction in terms of the future. In too many instances primary molars are removed without discussing with the parent the probability of closure of space and the probable orthodontic implications. Parents have frequently made this comment: "Why didn't my dentist discuss the possibility of closure of space?" This latter question may be answered in part by the instruction the student received while in dental school. Often little or no actual experience has been obtained because of lack of requirements in the teaching of dentistry for children, and the end result is only a passing interest.

Various estimates from 20 per cent[1] to 28 per cent[4] to 65 per cent[3] have been made stating that early or premature extraction of the primary teeth was the cause of malocclusion. Cohen[2] in a recent study referred to a series of 21 patients wherein 18 first primary molars were lost prematurely, and only 1 first bicuspid did not erupt properly. He further studied the areas wherein 15 second primary molars were removed, and found that 9 out of 15 second bicuspids erupted in good position. Therefore, 40 per cent of the spaces closed when the second primary molar was removed prematurely.

The writer has observed 41 children who have come to the dental clinic at the University of Iowa Children's Hospital for an average period of 24.6 months, and the time range was from 4 to 64 months. The ages vary from 5 to 11 years. Each patient had a complete dental examination at least every 6 months, and in most instances roentgenograms were taken every 6 months. The patients were mainly controlled diabetics and congenital syphilitics who returned to the out-patient clinic for routine check-ups. It is the policy of the Pediatric and Pedodontic Staffs to have roentgenograms of the arches and teeth made every 6 months which enables one to make regular observations on a group of patients over a long period of time. The following data is herewith presented:

Premature Extraction of 42 First Primary Molars

22 or 52% of the first bicuspids erupted in fair position.
5 or 12% of the spaces were not closed and the bicuspids still had an opportunity to erupt.

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Observed 1 for 6 months.
Observed 3 for 27 months.
Observed 1 for 29 months.

1 bicuspid erupted in definite malocclusion.

14 or 36% with closed spaces and definite malocclusion unless space reopens.

Premature Extraction of 71 Second Primary Molars

24 or 34% of the second bicuspids erupted in fair positions.

3 or 4% of the spaces were not closed and the bicuspids still had an opportunity to erupt.

Observed 1 for 6 months.
Observed 1 for 27 months.
Observed 1 for 29 months.

2 second bicuspids erupted in definite malocclusion.

42 or 62% with closed spaces and definite malocclusion unless space reopens.

In the above cited 47 patients (42 and 2 and 3) wherein the spaces had been definitely closed, in 3 instances or 6.4% the spaces later reopened to permit eruption of the second bicuspid.

It was of further interest to note that in 17 patients, 26 first and second primary molars were removed at the same time in the same segment. The following information is from this group:

9 or 35% had the first and second bicuspids erupt in fair position.

2 or 8% had spaces remain open giving both bicuspids an opportunity to erupt.

11 or 42% had the first bicuspid in good position with the second bicuspid space closed with a malocclusion unless the space reopens.

4 or 15% presented both bicuspids in malocclusion.

From the observations cited in this study, particularly with reference to the first primary molar, the writer cannot completely agree with Cohen[2] when he states: "Our findings disclosed that in the children we studied the premature loss of the first deciduous molar did not result in collapse of the space, so space maintainers as such, are seldom indicated in these cases. The loss of the second deciduous molar presents a different picture. The space created by its loss should be carefully observed and a maintainer placed in the arch at the first indication that space is materially closing. But here again, if the second deciduous molar is lost before the first permanent molar erupts, the problem is accompanied with serious difficulties. The only type of space maintainer which might be useful in these cases is a type of maintainer introduced by Willett some time ago, with which you are no doubt familiar. It usually requires some preliminary surgery, and considerable skill to construct and properly cement into place."

Neither can the author agree that it is a difficult procedure technically to place a second primary molar retainer even though the first permanent molar has not erupted. The senior students in the dental clinic at the University of Iowa in the College of Dentistry routinely place such maintainers with no more difficulty than an average bridge for an adult. Such maintainers are usually placed immediately after the extraction of the second primary molar.

Summary and Conclusions

I. Approximately one-third of the first primary molars removed early or prematurely will lead to closure of space and malocclusion.

II. At least one out of every two of the second primary molars removed early or prematurely will result in closure of space and malocclusion.

III. Approximately four out of five first bicuspids will erupt in fair position when both the first and second primary molars are extracted prematurely at the same time in the same segment. However, approximately one-half of the second bicuspids will not be able to assume their intended position.

IV. The practitioner thinking only in terms of closure of space (first and second primary molar areas) and not in terms of function and extrusion of the opposite tooth may resort to a period of observation to note the tendency to collapse.

V. In cases where the arch form and occlusal relationship is acceptable and one anticipates at least three months or more time before the bicuspid or bicuspids will erupt, and wherein there is some concern about the possible extrusion of the opposite tooth or teeth and function in the area, the author advises a space maintainer in either the first or second primary molar area.

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PROBLEMS OF THE PEDODONTIST

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There are many problems of the pedodontist and an effort will be made to list some at least, and possibly in the order of their importance. Yet, that is difficult to do, because the condition that obtains at a given moment is most important at that time.

This will also be something of a review of the experiences in the life of one who has spent about five-sixths of his time in the care of children, beginning at a time when there was no great amount of assistance to be had. The field was virgin territory, nor was there any competition. It was a time before the specialty of pediatrics was developed within the profession of medicine. The thermometer registered zero, as far as interest in children was concerned. Nobody's blood-pressure was raised in a "hurry-up" effort to have them attended to, but on the other hand, even serious opposition was met on the part of parents and dentists. The child's teeth were only "temporary," so why waste time and money on them?

Problem No. 1 was solved in due time, by patience and persistence, until today, we meet very little if any opposition. Likewise, these teeth are now known by their true delineation, deciduous teeth, and are thought of as permanent for a certain period of time. We have learned that childhood is a period in one's life when thoughtful attention will bring about the best results.

Problem No. 2 related to the work to be done. There were many cavities, almost as many infections, and extractions galore. We were taught to use cement and gutta percha, which had no lasting qualities. We tried to clean up some infections with incompetent drugs. We extracted teeth under difficulty, for cocaine could not be used in sufficient quantity to be of any use, and nitrous oxide was not well understood. But this problem was solved presently by use of drugs which were introduced by Dr. John P. Buckley as early as 1904, but, as is generally the case, acceptance came about later. Abscesses responded to formo-cresol, thus many teeth were made serviceable and extractions were reduced. Novocain was introduced and administration of nitrous oxide was scientifically determined. Careful study of filling materials was made, alloys were improved, and became adaptable to deciduous teeth. Dental anatomy of the deciduous teeth took on increased importance and we learned how to prepare cavities in those teeth, so that metal fillings could be used with safety so far as possible irritation was concerned and they remained useful for a longer time. We soon learned not to fill canals of the deciduous teeth with gutta percha points or paraffin, as was used in permanent teeth; but pastes, which disappear as the root disappears, came into use and a new day dawned for children and their teeth.

Problem No. 3 probably had something to do with irregular teeth and the orthodontist. Previously the child was sent to the orthodontist, but he

didn't treat the individual tooth for caries or infection, nor would the family dentist do it. This was a real problem then, but today, the story is very different.

These three may be said to be the major or all-inclusive problems, each bearing many details and smaller problems. Though there is one yet, and of major significance too, that of payment of the bill. The dentist had to be paid and the parent had to pay.

Problem No. 4 is the one to which we need give special attention even today. Payment of the bill was accepted as soon as the idea of temporariness was driven out of the mind. Children under twelve get their meals, travelling expenses and many other items of living at one-half price. Yet they are almost of greatest expense. But the dentist could not keep up and pay half the bill. Both parents and dentists had to be educated in this. They were, and today that is not a problem.

Problem No. 5: With the advance of time and with changing conditions, there is to be found in this problem, another which must not be overlooked. As the dentist grows older, he grows farther from the new parents of new children and new dentists, school and college mates of these new parents, come into the picture. This results in a change from a busy to a reduced practice and from a younger to an older clientelle. Pediatricians who have been in practice for several years have extended their age limits to higher brackets, including the college age group, and, as a medical officer recently stated, "they are now becoming the family physicians."[1]

Geriatrics is a new specialty, opening up within the medical profession. What about dentistry? This must be answered from two angles. Older people require special consideration and older dentists will require patients. It will be necessary for the two to get together.

The pediatrician and the pedodontist serve well the young child and the young patient. Children of today are developing into splendid youths by those who have taken advantage of these possibilities. A good start has been given and lengthening of life has been extended. This means a greater number of older people, in fact, so great that for the first time has the need of special consideration for them, been pressed upon us. This special consideration "involves the treatment of senile diseases, the care of the aged, the causes of senescence and the measures for prolonging life," as stated by I. L. Nascher, M.D., in 1914.[2] Modifications of this statement may apply to dental care of this group of people and dentists must give thought to it. Dentists must give thought to it both from the standpoint of those requiring attention and those who have the attention to be required.

These are some, at least, of the problems confronting the pedodontist. It is well to give heed.

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EVALUATION OF RADIODONTICS IN PEDODONTICS

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In spite of its unassailable position in the realm of dentistry, it is still only in the exceptional instance that radiodontics is employed in the treatment of child patients, particularly those of a tender age. This, in spite of the fact, that with a proper technique, similar to the one described elsewhere,[1] even the youngest child becomes easily amenable to a radiographic examintion.

It is high time the dental profession aroused itself to the realization that radiodontics constitutes a most important aid in forming and substantiating diagnosis in every branch of dentistry, preventive, operative, prosthodontic, orthodontic, oral surgery, exodontia or pedodontic.[2] According to McCall and Wald,[3] with whom we entirely agree, it is the prevailing assumption, long held by the majority of the profession, that the only occasion for a roentgenogram for adults, is when a patient is in pain, and the dentist cannot find the source of that pain.

Still, abundant evidence exists that a grave injustice may be done, if the x-ray is not added to the mouth mirror and explorer in the armamentarium for mouth examination, particularly with young children.

This highly deplorable, though undeniably existing condition, may be attributed to the following factors:

1. General lack of interest on the part of the average dental practitioner —coupled with frequent parental opposition, due mostly to ignorance—to attempt to preserve the deciduous teeth for their complete life span.

2. Failure to recognize the significant role that premature loss, as well as the prolonged retention of deciduous teeth, plays in creation of malocclusion.

3. Failure to recognize the large part that prolonged retention of infected deciduous teeth bears in undermining a child's general health.

4. Failure to recognize the importance of periodic roentgenograms for a child patient,[4] to observe the ever-possible presence of supernumerary teeth, to discover congenital absence of permanent teeth and to keep under close observation decalcification of deciduous and calcification of permanent teeth.

5. Lack of good judgment on the part of the dentist toward safeguarding himself from the ever present possibility of a law suit through not possessing any radiographic evidence in the event complications arise after an extraction or some other, however minor, surgical interference.[5]

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6. Unsuitable temperament of the radiodontist, and lack of desire and initiative in developing the necessary specialized technique when practicing for children.[1]

7. General apathy and disinterest in usage of radiodontics for diagnosis in children as well as in adults.

It is becoming of late a well recognized fact, that while dental disease is rampant among adults, this condition is especially prevalent among children of preschool as well as school age. According to figures compiled at the Guggenheim Dental Clinic, New York City,[6] 98.2 per cent of preschool children are affected by caries. What is more, it has been conclusively established by McCall and other investigators that fully half of the caries found in deciduous molars originate in proximal surfaces.[6,7] It seems to me, that recognition of this factor alone is of such tremendous importance for successful practice of preventive dentistry and for curtailment of premature loss of deciduous teeth, that it should be loudly proclaimed from every dental rostrum.

This fact, if nothing else, should induce the conscientious dental practitioner to institute, whenever possible, a minimum radiographic survey for his child patients, regardless of age. This examination should consist of at least two or more bite-wing films showing the crowns of the posterior teeth. This sort of survey encourages not only the early detection of proximal caries, but demonstrates the depth of penetration and the proximity of the caries to the pulpal chamber.[4]

One must not, of course, lean entirely upon Roentgen-ray examination for discovery of caries. It has been our experience, in common with many others, that while x-ray has proved itself almost indispensable in revealing proximal caries· a supplemental clinical examination invariably proves itself most essential, especially for locating carious areas on the surfaces accessible to the explorer. Here numerous cavities show by ocular-instrumental examination and may remain unseen on the roentgenogram.[6,7]

Again in a recent investigation,[8] in an attempt to establish the comparative reliability of the usual clinical and radiographic methods of diagnosis of caries, it was found that the clinical method gave a higher incidence of positive diagnosis than the radiographic. Of the teeth examined, caries were discovered in 80 per cent by basic and histologic examination. The clinical examination revealed caries in 62 per cent, while the radiographic examination revealed them only in 48 per cent.

Another important use of radiography in children is observation of the growth phenomena in teeth and jaws. The latest studies conducted by Kronfeld and Schour[9,10] carried out mostly with radiographic aid have resulted in a basic modification of the chronology for tooth development in the prenatal period, which previously had been accepted by the profession as final for nearly two full generations. One should, therefore, in view of these studies, be prepared to "encounter variations in tooth development and tooth eruption at various age levels."

Again, observation during tooth development with the aid of well produced roentgenograms of incompletely formed roots will occasionally prevent confusing these inadvertently with areas of pathosis, which they so closely simulate.[11]

Parallel recent studies[10] with the Roentgen-ray have considerably modified the dictum that a certain definite degree of tooth development in intrauterine life takes place characteristic of that period. This brings to mind the importance of the pre-natal dietary to foetal tooth development.

The dental practictioner, who employs radiography frequently for children, realizes that most pathological conditions which occur in the mouths of adults may also occur in the mouths of children. He evaluates diagnosis through radiodontic means highly, for he is frequently able to discover and relieve obscure pain and pathosis, which could not be determined by any other method of diagnosis now at his disposal.[12, 13, 14]

A recent instance in practice may perhaps serve here as an illustration. A girl, four and a half years old, was referred to us for diagnosis and treatment of a highly acute oral pain, which had lasted for several days practically without interruption. Two neighboring dentists together with the family physician had been previously consulted and were at a loss as to the cause and origin of the child's pain. When she was examined by us, no cavities were found in her apparently normal dentition. There was no history of trauma, nor any evidence of adenopathy, trismus swelling or tenderness in any part of her jaws. Still, the child ran a temperature and was quite restless and experienced undeniable pain somewhere in the lower right region of the mandible. Before referring the patient, the physician in charge definitely suspected some serious, deep-seated ailment.

When an extra-oral radiographic plate was taken, a completely submerged unerupted second deciduous molar with a large coronal cavity leading directly into the pulp was discovered. The presence of this had been entirely overlooked in the clinical examination, since there was absolutely no visible break in the soft tissue beyond the first deciduous molar. With the removal of the tooth the pain ceased instantly, and the child became well.

Another case illustrating the necessity of a roentgenogram in consistently exercising caution against litigation may be given. A neighboring dentist removed a putrescent deciduous molar for an otherwise apparently well child. Shortly after, the child developed periosteitis, lymphadenitis and cellulitis in the region of the mandible where the extraction was performed. This required several external incisions, to establish drainage.

A law suit was instituted by the parent with the principal claim that the complication was due to the negligence of the dentist, who had performed the extraction without the aid of an x-ray. It is needless to say that "a jolly time was had by everyone concerned." All, because of the inability of the dentist to produce the most concrete accepted legal evidence, a radiograph.

Still another example may be here cited, when only a casual clinical examination and the neglect of using a radiograph was nearly the cause of

possibly permanent disfigurement and expensive orthodontic treatment in an otherwise simple, self-evident case.

When the child, a girl of eight, was brought in to the family dentist about two years prior, the mother expressed her anxiety as to the absence of the child's upper permanent centrals. The dentist after looking at the mouth, told the mother not to worry, and explaining the condition as one of delayed eruption, particularly, when the mother related that the child's deciduous centrals were lost just a while ago. No radiographic examintion was ever attempted, since the diagnosis was presumably "entirely clear."

Though the patient was brought to the family dentist periodically, the same explanation was regularly given to the mother. Finally, the mother became anxious and brought the child to us for consultation.

The examination clearly revealed why permanent centrals refused to erupt. Both permanent centrals with almost fully developed roots were present and were seen overlapping the roots of their respective laterals.

Similar instances, clearly indicating the absolute need for frequent and consistent application of radiodontics in pedodontics, as well as in dentistry for adults, together with general improvement in radiodontic technique can be cited *ad infinitum.*

It is high time, indeed, that our profession was aroused from its lethargy, and nothing illustrates better the present standard of radiodontia than the following statements found in two recently published authoritative textbooks: "It may come as a shock to some dentists, but it is a fact, that a full mouth series of radiographs properly posed and taken with correct angulation of the x-rays for each film, invariably excites admiration among both dentists and patients, as though some near miracle has been wrought,"[3] and "A set of alveolo-dental radiographs of more than average excellence, is being explained on the basis of fortunate coincidence and, instead of being an object for study in order that the operator might produce others of like quality, it has been either used as an object of constant exhibition, or becomes an addition to the store of pleasant memories."[15]

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THE CHILD'S TOOTHBRUSH

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Because of the increased public interest in mouth hygiene and the more modern scientific attitude of inventors and manufacturers, many toothbrushes are now available for the special needs of children. These varieties give the dentist ample opportunity to help his young patients get the most out of the home care of their teeth. The enlightened practitioner knows that some toothbrushes are better than others and that different types of mouths require different types of brushes. One does not have to be an expert in order to give practical toothbrush information to the parents of his young patients. Such advice means much in the matter of parental appreciation.

Occasionally dentists recommend a single row nail brush for the very young child with only some of his foundation teeth present. There are also small size single row tooth brushes obtainable for such cases. However, the mother of a child under two years of age usually relies upon absorbent cotton or gauze to do the work of cleaning. Once the entire foundation set is present, the little fellow is able to learn how to brush his own teeth even if some help must be given in behalf of his beginning efforts. There is no good reason why a two or three row toothbrush cannot be used for the pre-school child; certainly there are several efficacious designs to be had. The weak spot in the child's mouth hygiene armor is the pre-school age, and more attention should be given to all children between the years of two to six. During this crucial period impressions are made which will serve the child usefully as he grows older.

Every dentist should acquaint himself with various types of toothbrush. The layman selects a toothbrush after a fashion and too often through the medium of catch-as-catch-can advertisements. It should be realized that not all good brushes are advertised to the public and neither are all advertised brushes good ones. Especially should the child's toothbrush receive more careful attention; ordinarily both dentist and parent take this important matter more or less casually. One of the points discussed in toothbrush selection is that relating to the choice between a two and three row device. In recent years the tendency has been to favor the former because of its smaller size and attendant greater manageability by the young child. Nevertheless, older children approaching the completion of the permanent dentition can use a three row brush without difficulty and to greater advantage because of the increased brushing surface.

Every toothbrush should have certain desirable features in order to make it a practical hygienic cleansing device for average use. We submit the following qualifications for such a brush:

1. It should be pleasing in appearance and attractive in general construction.

2. It should be light in structure and not cumbersome in application.
3. It should not require complicated manipulation for its efficient use in the mouth.
4. It should bear a distinguishing mark of identification for the personal convenience of the user.
5. It must be easily cleansible and in shape and structure not conducive to the retention of foreign matter.
6. It should be obtainable in various sizes according to individual requirements.
7. The bristles must be of substantial quality, firmly set within the back of the brush and not loosen upon usage.
8. The bristle should be obtainable in varying degrees of hardness.
9. The arrangement of the brushing surface should be such as to allow for the complete cleaning of all the exposed surfaces of, and all the exposed interproximal areas between, all of the teeth present.
10. It must be inexpensive enough to allow for frequent renewal.

There is, of course, no such thing as a perfect toothbrush and the most we can hope for is one that meets the conditions present to the greatest possible degree.

It is a good idea to have the child bring his toothbrush to the office as soon as possible after the first visit. Some dentists make it a policy to present every new little patient with a toothbrush as a token of good will and evidence of concern with the personal mouth health habits of the recipient. Upon inspection of the brush, if it is one which has been purchased by the parent without professional advice, the dentist can give it his approval or disapproval. If not a good brush its elimination should be urged and a better one suggested. Sometimes a little trimming of the bristles, with the aid of a pair of scissors, makes a reasonably satisfactory brush safely usable. When the acceptable brush is at hand, the child is given personal instruction in its correct usage; he is asked to rehearse in his own mouth what has been demonstrated. This instruction is an important function of the dentist in his capacity of teacher. Another important matter to discuss with the parent is the home sanitary care of the toothbrush. The layman should be informed that it is unclean to throw all the family toothbrushes into the same tumbler or other common container. Each brush should be hung in a place by itself or kept in a ventilated container in order to avoid having the brushing ends come in contact with one another. All parents should be advised that toothbrushes should be renewed frequently; once every three months is not too often. A good toothbrush in sanitary condition is wise economy. No toothbrush at all is preferable to an unclean, overused one.

If every dentist were to take more interest in personalized advice on toothbrush selection, manipulation and sanitation, there would be many more friends gained by our profession.

27 East 95th Street.

What Technics May be Used to Secure Relaxation in a Child Patient?

By C. H. Carpenter, D.D.S., Cheyenne, Wyo.

Before discussing the technics that may be used to secure relaxation in a child patient, one should first consider the facts that cause physical and mental tension in children when they visit the dental office. The percentage of children who visit the dental office and sit through an appointment with mental and physical relaxation is very low, compared with those who are slightly hesitant, moderately hesitant and those who are really "scared to death." Not only is tension of the mind, muscles and nerves present in children, but it is probably more predominant in adults because of the impressions which they have received when they were children. The cause of this tension must be attributed to some form of fear.

Fear is a common emotion, an inherited instinct, and quite necessary to the well being and safety of all children. Only when that fear is maladjusted does it become harmful. When a child is born, the inherited causes of fear are said to be first, loss or removal of support, and second, loud noises. Two other sources of fear that are developed during the first year of life are pain and imitation. A child first becomes conscious of pain through some minor accident, such as a prick by the point of an open safety pin or a bump against the side of his crib. Imitation comes to the child from close association with his parents after whom he patterns, particularly during the first few years of life, and the impressions received are very apt to stay with him for years to come. It should, therefore, be the duty of all parents to carefully weigh their words and actions when in the presence of the child, so that he may not develop the wrong kind of fears.

A child's fear of the dentist, the dental office, or dental work, hence, is not natural but acquired, and is likely to be the result of imitation. From a remark carelessly made by a parent, or someone older than the child, regarding the "terrible ordeal" in the dental office which was barely survived, or the pain that the dentist caused in filling a tooth, can come a child's impressions that the dentist or the dental office is no place to visit. Perhaps the child is too young to fully realize the meaning of the word dentist, but he gains an impression of fear toward the unknown. Because a child comes in contact with pain of some kind very early in life, he quickly learns that he should avoid it. Signs of pleasure and disappointment are the only early responses that a child has. It is said that reasoning is first evidenced by a child as early as three months of age. So in the child's mind he reasons that dentist and pain must be associated. Then when the subject of his visit to the dentist is mentioned, he displays great disappointment and balks at the idea, because he feels certain that he will undergo some sort of pain. Such a child has a mortal fear of the dentist even before his first contact and there is no concrete reason for his fear aside from carelessness or thoughtlessness on the part of the adult person.

A child looks forward to any new experience with some degree of anticipation and pleasure, or with fear. With the present dental technics there is little reason for the child patient to experience pain in most of the necessary operations, and especially is this statement true if his first appointment has not been unduly delayed. He can honestly anticipate his appointment with the dentist with pleasure, and fear should have no existence in his mind.

While no definite "technic" can be quoted the first requirement to secure relaxation in the child patient is parent education in respect to fear control in children. It would be better, probably, to extend this education to include all adults and near adults. If in all adult minds could be instilled the danger from elucidation of harrowing details (four-fifths exaggeration) of dental operations, half of the battle to secure relaxation would be won.

If the child's first impression of the dentist is a favorable one, and the dentist does not frighten the child patient or inflict pain, the child will become a good patient naturally. Happiness is a child's normal state of mind, and if he is happy in the dental chair his inclination is to do as the dentist tells him, to have no fear and to sit relaxed. It is possible for a child to become as fond of his dentist as he is of his parents, and particularly is this reaction true up to the ages of five or six. But the child must have the same confidence in his dentist as he has in his parents. If the future adults are to have good teeth, dentists and parents must create in children a good mental attitude toward dentistry, stress the benefits of dental health and not implant dental-office inhibitions in children.

As the second requirement to secure relaxation in the child patient, one may list the gaining of the child's confidence by the dentist. On his first visit, the child makes his personal appraisal of the dentist to decide whether he is to be trusted or to be feared. It is, then, the dentist's responsibility to present himself and his environment in such a way that dental treatment becomes acceptable. When the child accepts the appearance and personality of the dentist with confidence, and in good faith, he is ideally prepared to accept dental treatment.

Children should be treated as individuals, not as a group, species or clan. A technic to win the confidence of one child will not work so favorably, perhaps, for the next one. The fears and suspicions of one child will differ from those of another, and the dentist must learn to adapt himself to successfully cope with each child's experience. Appointments for children should be so arranged as to eliminate waiting in the reception room for longer than a few minutes at the most, and for the waiting period some provision should be made for entertainment by books, toys or pictures. A pleasant, well-trained assistant can be of material help at this stage of the first visit. Quite often she can break down the first barrier to an appreciable degree. The dentist, as well as the assistant, will find it helpful to greet the young patient by his first name or nickname, whichever he is most accustomed to hear and likes best. For the first appointment the child's first name and a few of his interests often can be ascertained from his parents in advance. The child should not be rushed, but be engaged in conversation about things

which interest him. This technic is excellent to gain confidence. Children are usually very curious, so time should be taken to answer their questions, choosing simple words carefully in order to explain adequately and not arouse new fears in their minds. On the first appointment it is good practice to do something, such as a prophylaxis, or an X-ray along with a partial examination. An adult dentist at least, should not allow a child patient to "bluff" him out. The operator should not fumble around for instruments, but follow a carefully planned procedure that will hold the child's interest. The words "hurt" and "pain" should never be used because they imply danger in the child's mind and, therefore, something to be avoided. Make the child think that he is important. Enthusiasm is contagious; if the dentist attempts enthusiastically to make the child like him, the office and the dental work, the small patient is more apt to become enthusiastic over his visits to the dentist. To secure the confidence of children, the dentist must first have confidence in himself, both in his ability to handle children, and to do careful and good work for them.

For young children particularly, the appointments should be made at times when the child's resistance is highest, usually between the hours of nine and eleven in the morning, and two and four in the afternoon. Parents should be instructed to say nothing to the child between appointments whereby he may develop a fear complex, but, instead, exert every effort to build up his enthusiasm. When a dentist is fortunate enough to get a child into his office for a first visit, he has an opportunity to make a good patient for all subsequent visits. With the present methods and facilities to do dentistry with a minimum of discomfort to the patient, and with a possibility for the elimination of the original and needless fear complex in young children, more relaxation may be expected from future dental patients.

The suggestions which have been made have little to do with securing complete relaxation in the child patient in the true meaning of the word. There will always be the patient who has already developed a severe fear complex for the dentist or dental work, perhaps because of remarks that he has heard, or perhaps because of a previous bad experience in the dental chair. Of course a psychological approach and a good personality will help to handle poorly conditioned patients of this kind, but it is doubtful if the dentist can secure very much relaxation in the patient who is already a victim of a fear complex. In addition to the poorly conditioned patients the dentist has to deal with high strung, nervous, temperamental and hysterical children. They are likely to behave poorly because they have patterned after parents of the same temperament. Extreme care must be exercised to handle a child of this type not to make a bad condition worse. There is usually no reason for the parent to be present in the operating room during the time that the child is having dental work done, particularly is the parent's absence desirable with children of this type. One hysterical person to handle at a time is sufficient, and the offending parent should be definitely dismissed from the operating room. Furthermore, it is important that the dentist show no indications of excitement. He should act quietly and calmly at all times,

work carefully, surely and quickly and accomplish as much as possible in a short period of time.

Pre-medication in the form of a sedative or hypnotic is indicated in some cases of extreme fear or nervousness, and if the operation will exceed twenty or thirty minutes of exacting work. Amytol is moderate in its action and pheno-barbital is a long acting hypnotic. The dosage should be based according to the age of the child. Young's method can be used to determine dosage: Age, divided by age plus twelve, equals per cent of adult dose. An excellent hypnotic is nembutal, dosage of the elixir is one teaspoonful (one fourth grain) for each five years of age. Given fifteen minutes before operating time it will relax the child patient sufficiently to withstand about forty-five minutes of work. There are no ill after effects from nembutal, and its ease of administration makes it one of the best hypnotics for children. The dentist must guard against the possibility that the parents receive the impression that their child is being given "dope." The dentist should explain fully and frankly the reason for using the hypnotic and give the child's parents the assurance that it will not prove harmful. At the same time the dentist should use discretion in the administration of any sedative or hypnotic.

A child should not be subjected to severe pain in any dental operation, and if the possibility of such pain exists, a local or general anesthetic may be utilized depending upon the type of operation. For cavity preparation, either block or infiltration injections, using novocain, seem to be the predominant choice of most dentists. Even thought the patient is entirely conscious, if he is satisfied in his own mind that he will experience no pain, he will become more relaxed. A sharp, small gauge needle should be used to relieve the possibility of pain in its insertion. A small syringe also has a good psychological effect upon the child. The combination of nitrous oxide and oxygen is used to advantage in cavity preparation if given to secure the analgesic stage in older children. For the two-to-four-year-olds, however, who will not cooperate with the dentist, and who present a number of cavities, a deeper stage of anesthesia is more advantageous.

General anesthesia for children is very often indicated, and is an excellent means to secure positive relaxation in child patients. The choice of the anesthetic agent should depend, however, upon the effects it produces on the child. Aside from nitrous oxide-oxygen, already mentioned, ethyl chloride, somnoform, ethyl ether, vinyl ether and chloroform have been used to induce general anesthesia. There are advantages and disadvantages to each. Chloroform, vinyl ether and ethyl ether are not popular as general anesthetics for children because they necessitate hospitalization, and should be used only in hospital cases. The long induction period and slow recovery from ethyl ether does not make it practical for the majority of children. Chloroform is too dangerous. Vinyl ether is non-irritating, pleasant to inhale, induction is rapid, recovery is peaceful but it should be administered only by an experienced anesthetist who is familiar with all anesthesia signs and can watch the patient continually.

Nitrous oxide-oxygen, somnoform and ethyl chloride are the most practical general anesthetics for children, especially for the extraction of teeth. The induction and recovery periods of all three are rapid and usually uneventful. There are no obnoxious odors or bad tastes left in the mouth following recovery. All three may be used as analgesics or anesthetics. Anesthesia produced by ethyl chloride is of short duration, by somnoform a little longer, perhaps lasting ten minutes, and nitrous oxide-oxygen anesthesia can be prolonged. So for all general purposes where a general anesthesia is needed for a child, nitrous oxide-oxygen is probably the safest and best to use.

In conclusion, then, we might list, as technics to secure relaxation in a child patient, the administration of general anesthetics as complete relaxation agents, and of local anesthetics and hypnotics as partial relaxation agents. But probably most important in all respects, and especially to secure nautral relaxation, is the prevention and elimination of fear, the securing of the child's confidence by the dentist, and the avoidance of pain from toothache by early treatment.

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What Scientific Indications Have We for the Use of Red Copper Cement in Dentistry for Children

By Herbert H. Glenn, D.D.S., Paris, Illinois

A review of the literature has been made to determine what scientific evidence there is to approve, or disapprove, the use of red copper cement in the practice of dentistry for children.

Copper cements were developed with the idea that they would have sterilizing or germicidal qualities while and after setting. There is a great deal of controversy at the present time, as to whether or not, there is ever a need of sterilizing properties in a cement. If a non-leaking restoration is placed over a cement base in a cavity that has been thoroughly sterilized, there should be no way for the cavity to become contaminated, and therefore no need for a germicidal cement.

Most of the so-called copper cement powders are, in reality, simply zinc oxides containing varying amounts of copper compounds. The compounds used in these powders are usually varying amounts of oxides of copper. These copper compounds range from less than 0.1% to over 90%, in the proportions which they replace the zinc oxide. The liquid for these cements is the same as that of regular zinc phosphate cements which is an ortho-phosphoric acid solution. Ames' red copper cement is 99% cupric oxide. Fleck's red copper cement is 25% cuprous iodide.

Holmes[1] reports that at the time of mixing these cements, there is some copper phosphate in solution and a slight penetration of the tooth structure is probable. Poetschke[1] who tabulated the relative germicidal efficiency of various copper cements, took hardened pellets, ground them to a fine powder and used this material for tests. While this method of testing gives relative results, it does not necessarily express the result which might be obtained under oral conditions. The germicidal efficiency of the hardened pellet, ground to a fine powder, would naturally be greater than the same material in the bulk form of a filling, since the exposed surface of the powder would be infinitely greater.

Fraser[2] reports that when first mixed, all cements are germicidal owing to the excess of acid which is used in mixing. She also reports that all cements, except one silver cement, lose all germicidal power after repeated transfers. Hill and Boester[3] give evidence that all cements are germicidal in action during the setting period and that, if any germicidal properties exist in set cements, they are probably the result of the formation of soluble metallic salts. It therefore seems impossible for a cement used as a base to

be of any appreciable germicidal value since good operative practice indicates that it should be placed in a dry cavity and covered with a non-leaking metallic filling.

There have been a number of experiments conducted to determine the irritating effects of various cements and filling materials on the pulp. Some of the latest of these were conducted by Gurley and Van Huysen[4] and by Manley[5], who used approximately the same procedures and obtained comparable results. From the report of Manley's work we learn that any peripheral injury to the dentin causes a reaction in the pulp. The Gurley and Van Huysen experiments, as well as those of Manley, were conducted on canine teeth of dogs. The dogs were anesthetized and cavities cut by the use of a sharp drill in a slow motion hand piece. This procedure was followed to reduce the traumatic effect of cutting as much as possible. Sixty upper and lower canine teeth were used in each case on one side of the mouth only. The teeth on the other side were left as controls. Some of the prepared cavities were left open, others filled with silver amalgam, silicate cements, germicidal cements, zinc oxide and eugenol, and gutta percha. The cavities were filled immediately and after 10 to 12 weeks the dogs were killed and their teeth removed and sectioned. The results showed that there was no appreciable reaction in the pulps of teeth filled with zinc oxide and eugenol, but all of the rest of the teeth showed reactions including the pulps of the teeth in which the cavities were left open as well as those in which gutta percha was packed tightly. The reactions set up under cavities filled with germicidal cements were of great severity and different entirely in characteristics from those set up by either amalgam or silicate cements. The type of secondary dentin and degree of reaction depended on the severity of the injury and subsequent irritation.

SUMMARY

(1) A cavity that has been thoroughly sterilized and filled with a non-leaking filling needs no continued sterilization.

(2) All cements have germicidal qualities while setting due to the orthophosphoric acid present.

(3) Finely ground copper cement pellets do possess germicidal qualities.

(4) Copper cements are more irritating to the pulp than zinc cements.

One may conclude, since copper cements are more irritating to the pulp than zinc cements, and their germicidal qualities are very limited in a dry cavity after the cement has set, that there are no indications for their use to replace zinc cements in the practice of dentistry for children.

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News and Views

THE PRESIDENT'S MESSAGE

To All the Members of the American Society of Dentistry for Children:

The next annual meeting of our Society promises to be an interesting one. The program, printed elsewhere in this issue of the JOURNAL, (Page 241) will give you an idea of what is in store for you. I believe you will find it instructive, interesting and worthwhile.

The afternoon program is timely, and is calculated to call attention to an important phase of the practice of dentistry for the child, a field which can no longer be overlooked by any member of the profession. This program should be of interest to all members of the dental profession, and you are urged to invite your friends who are not members of our Society to attend.

The American Society of Dentistry for Children, since its organization, has labored to interest all members of the dental profession in pedodontics. Our efforts have met with a fair measure of success, and we can point with much pride to our achievements. There is still much to be done, and as a Society, organized with a promotional background, we are standing on the threshold of an era of great usefulness; greater usefulness than at any time in our history. Our efforts to bring the dental profession to a keener appreciation of its obligation to children are finding new sources of inspiration.

We have been upset by the appalling figures representing the number of selectees rejected for military service, because of dental disability. The preschool age is the time to start a program seeking to establish dental preparedness.

We might well adopt for our slogan, "DENTAL PREPAREDNESS DOES NOT BEGIN AT AGE 21—START WITH THE PRESCHOOL CHILD."

COME TO HOUSTON.

FRANK F. LAMONS, *President*
503 Doctors Bldg., Atlanta, Georgia.

SECRETARIAL MESSAGE

Our presiding officer genial Frank Lamons has come out of the huddle with his commitee chairmen and your secretary can assure you that those who have been responsible for the planning of the coming annual meeting have arranged an interesting and informative program. Those who attend will appreciate it beyond ordinary expression.

The official headquarters of the A.S.D.C. has been engaged and designated as the Lamar Hotel, Houston, Texas.

Delegates from the various Units will please notice that the joint meeting of the delegates with the Executive Council will be held Sunday, October 26th, Room 901, Lamar Hotel, 2:00-4:30 P.M. Please be prompt in your attendance.

The following organizations have accepted our invitation to join us on the occasion of our official annual luncheon.

American Association of Public Health Dentists
American Association of Women Dentists
American Dental Hygienists Association
American Association of Dental Assistants

The program is here presented—Attend!!

R. M. ERWIN, JR., *Secretary*
613 Corbett Bldg., Portland, Oregon.

PROGRAM

of the

American Society of Dentistry for Children

1941

Hotel Lamar, Houston, Texas

Sunday, October 26, 9:00-12:00 A.M., Room 901—Executive Council and Breakfast.

Sunday, October 26, 2:00-4:30 P.M., Room 901—Meeting of State Units' Delegates with the Executive Council; Ralph L. Ireland, Pres.-Elect Presiding.

Monday, October 27, 7:00-9 A.M., Room 901—Executive Council Meeting and Breakfast.

Monday, October 27, 9:30-12:00 A.M., Ball Room—(Watch for change of room assignment.) Annual Meeting in General Session A.S.D.C.
Scientific: Colored Moving Picture, "Operative Dentistry for Children," John C. Brauer, D.D.S., Iowa City, Iowa, Professor of Dept. of Pedodontics, University of Iowa
Paper, "Clinical Histology of the Teeth of Children," E. Kontanyi, D.D.S., Houston, Texas. Illustrated with lantern slides and exhibits. Professor of Histology and Pathology, Texas Dental College.

Monday, October 27, 12:30-2:00 P.M., Ball Room—Annual Luncheon in participation with the A.A.P.H.D., A.A.W.D., A.D.H.A.,A.D.A.A.
Special: Work of National Health Program Committee of A.D.A., R. M. Wall, D.D.S., Bethlehem, Pa., Chairman.
Speaker: Henry Borsook, Ph. D., M.D. Pasadena, California.
Subject: "The New Nutrition."

2:00 P.M., Ball Room—Joint Meeting with the A.A.P.H.D., A.A.W.D., A.D.H.A., A.D.A.A.
Greetings—R. C. Dalgleish. Response—Frank F. Lamons.
Symposium: "Coordinated Health Activities in a Dental Program for the Pre-school Child."
Subject: "Organization and Planning of Pre-School Program."

Essayist: Emory Morris, D.D.S.
Discussion Leader: Walter J. Pelton, D.D.S.
Subject: "Actual Contact with the Child."
Essayist: David B. Ast, D.D.S.
Leader of Discussion: Allen O. Gruebbel, D.D.S.
Subject: "Follow Up After Contact."
Essayist: Charles F. Deatherage, D.D.S.
Discussion Leader: P. E. Blackerby, Jr., D.D.S.
Subject: "Care of the Preschool Child by the Private Practitioner."
Essayist: Chas. A. Sweet, D.D.S.
Discussion Leader: Kenneth A. Easlick, D.D.S.
Subject: "Care of the Preschool Child by the Endowed Clinics."
Essayist: John Oppie McCall, D.D.S.
Discussion Leader: John C. Brauer, D.D.S.
Subject: "Orthodontic Care of the Preschool Child."
Essayist: Claude R. Wood, D.D.S.
Discussion Leader: Walter T. McFall, D.D.S.
Subject: "Pediatric and Pedodontic Cooperation in the Care of the Preschool Child."
Essayist: J. M. Coleman, D.D.S.
Discussion Leader: F. C. Cady, D.D.S.

A preview of the new dental film "About Faces" will be presented by Mr. Cator Weelford, Sterling, Georgia and C. V. Williams, D.D.S., Atlanta, Georgia.

At the close of the afternoon joint session the A.S.D.C. will be called into general session for the installation of the 1941-42 officers.

Tuesday, October 28, 7:00-9:00 A.M., Room 901—Executive Council Meeting and Breakfast.

Final Meeting.

Room 901 has been scheduled for the Sunday afternoon meeting of the Executive Council and the State Delegates. The meeting is called for 2 P.M.

According to the by-laws, Article VI, Sec. 3, the president appoints and publishes the personnel of these two committees thirty days prior to the annual meeting.

Nominating Committee—Walter T. McFall, Asheville, N. C., Chairman; Mark D. Elliot, Boston, Mass.; Jack Wisan, Elizabeth, N. J.

Auditing Committee—R. W. Scott, Oak Park, Ill., Chairman; M. L. Davis, Louisville, Ky.; Leonard Pogue, Nashville, Tenn.

A refresher course in Dentistry for Children is to be given at the College of Physicians and Surgeons, San Francisco, December 8 to 13, 1941, under the direction of Charles A. Sweet.

This excellent one week course includes:

Monday—Radiography for Children, L. E. Carter.

Exposed Pulps in Deciduous Teeth and Treatment of Non-vital Teeth Demonstration, Charles A. Sweet.

Anaesthesia and Extraction, Sanford Moose.
Tuesday—Child Management, Charles A. Sweet.
Demonstration Anaesthesia and Extractions, Sanford Moose.
Clinic Practice by the Class, Sweet & Randol.
Some Economic Aspects of Caries, Ernest Sloman.
Anatomy and Morphology of Deciduous Teeth, Edwin A. Randol.
Wednesday—Cavity Preparation, Fitting of Matrix, Placement of Filling Demonstration, Charles A. Sweet.
Clinic Practice by the Class, Sweet & Randol.
Thursday—Demonstration Child Guidance (Preventive Orthodontics), Frederick T. West.
Public Health, R. C. Dalgleish.
Pediatrics in Dentistry for Children, Clifford Sweet.
Friday—Caries Control—Fractured Anterior Teeth Demonstration, Charles A. Sweet.
Clinic Practice by Class, Sweet & Randol.
Extractions by the Class Supervised by Sanford Moose.
Saturday—Office Management Dental Economics, Chas. A. Sweet.
Clinic Practice by the Class, Sweet & Randol.

Mark D. Elliott announced the removal of his office September 15, 1941 to 196 Marlborough Street, Boston, Massachusetts. Practice confined to Pedodontics and Orthodontics.

A second edition of "Dental Caries," now in press, will be ready for distribution early in September. The *first edition*, issued two years ago, presented summaries of findings and conclusions on the causes and control of caries by 195 authors or groups of authors in twenty-five countries, and contained 189 pages. The *second edition* will present not only revisions of many of the summaries in the first edition—the rest remaining unchanged—but also summaries by 42 additional authors or groups of authors in twelve countries, and will contain 280 pages.

Copies, bound in cloth, may be obtained at the headquarters of the American Dental Association, 212 East Superior Street, Chicago, Illinois. First edition (1939), $1.00. Second edition (1941), $2.00.

REVIEWS

K. A. Easlick subbing for W. C. McBride

Ever since energetic Sam Harris sold the American Society the notion of its own dental journal and began to produce issues of a Review which later grew into a Journal, an excellent and sympathetic writer has been detailed to prepare the reviews of current editions and periodical articles. His task must have been a pleasant duty, though tedious at times because many of the subjects may have been a bit outside the range of interest of a children's dentist. Now comes the day when the excellent and sympathetic

reviewer refuses to continue his task. With a flush of modesty which surges pink from ear to ear he balks at the third edition of McBride's "Juvenile Dentistry."

For once it becomes a pleasure to serve as a substitute because this latest edition of "Juvenile Dentistry," which has just come from the press for college faculty examination, is delightful reading. The dentist who enjoys a well-told story in simple, excellently selected English, will find that this edition is bound to compete successfully with his favorite evening radio program or the current best seller.

Just leafing through this four hundred and fourteen page book, or reading the captions under its two hundred and ninety odd illustrations, provides an indication of the sane information which it contains. It is written from the very practical background of nineteen years of successful private practice, a practice which has been devoted solely to child patients. The operative technics which it presents are not only simple enough to prove practical to use for the management of small children, but also simple enough to consume a minimum of appointment time. Simple but adequate procedures supply the answers to two troublesome worries of practice for children, management of child behavior, and securing a satisfactory fee from the patient's parents.

The practical information in this latest "Juvenile Dentistry" is tempered by the author's broad reading of recent information from research and scientific investigation. The incorporation of information from the extensive bibliography has developed a textbook that is splendidly adapted to the use of students in dental schools. The undergraduate student can scarcely fail to glean a perspective of dentistry for children in which scientific operative procedures mold themselves to the practice of a health service which demands an intimate knowledge of anatomy, growth, development, occlusion, physical diagnosis, public health and patient education. Generous credit certainly has been given to the contributions of the author's contemporaries.

The chapters on Root Resection by Dr. Hall, Professor of Oral Surgery, and on Physical Diagnosis by Dr. Dwyer, Lecturer in Medicine, both of the University of Detroit, have been included without change. That on Morphology of the Deciduous Teeth, formerly Morphology of the Deciduous Molars, by Dr. Nuckolls of the University of California, now includes the anterior deciduous teeth.

The publishers, Lea and Febiger, have established the same fee of six dollars for this text as for the second edition. This small sum is deductible next March 15th when your mind grapples with statistics.